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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/844,283	04/30/2001	Aaron Buchwald	1875.0560003	1013
28393	7590	09/29/2004	EXAMINER	
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C. 1100 NEW YORK AVE., N.W. WASHINGTON, DC 20005			ZHENG, EVA Y	
			ART UNIT	PAPER NUMBER
			2634	

DATE MAILED: 09/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/844,283

Applicant(s)

BUCHWALD ET AL.

Examiner

Eva Yi Zheng

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 April 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 11-19, 21 is/are rejected.
- 7) ☒ Claim(s) 5-10 and 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 April 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>12/5/01, 7/24/02</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The informal drawings: Fig. 21C and 21D are not of sufficient quality to permit examination. Accordingly, replacement drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to this Office action. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action.

Applicant is given a TWO MONTH time period to submit new drawings in compliance with 37 CFR 1.81. Extensions of time may be obtained under the provisions of 37 CFR 1.136(a). Failure to timely submit replacement drawing sheets will result in ABANDONMENT of the application.

2. The drawing: Fig. 9 is objected to because it lacks to label X and Y-axis. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency.

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Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claim 12 is objected to because: it is a duplication of claim 11. Examiner suggests cancellation of claim 12.

Appropriate correction is required.

4. Claim 13 is objected to because of the following informalities: on line 11, "(3)" should be changed to --(4)--.

Appropriate correction is required.

5. Claim 15 is objected to because of the following informalities: on line 10, "(5)" should be changed to --(4)--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 2, 11-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Dabell (US 6,62,862 B1).

a) Regarding claim 1, Dabell discloses a method for adaptively equalizing a multi-gigabit analog information signal for a signal path, comprising the steps of:

(1) sampling a multi-gigabit analog information signal (141-144 in Fig. 1, Col 3, L 6-9; 220 in Fig. 2, Col 3, L 24-27);

(2) performing an equalizing process on the samples (330 in Fig. 3); and

(3) quantizing the equalized samples of the multi-gigabit analog information signal (351-354 in Fig. 3).

b) Regarding claim 13, Dabell discloses a method adaptively equalizing time staggered portions of a multi-gigabit analog information signal for a signal path, comprising the steps of:

(1) sampling a multi-gigabit analog information signal at a plurality of phases (141-144 in Fig. 1, Col 3, L 6-9; 220 in Fig. 2, Col 3, L 24-27);

(2) measuring an equalizing quality of the samples from one of the plurality of phases (Fig. 4);

(3) equalizing the samples from each of the phases based on the measured equalization quality of the one phases (330 in Fig. 3); and

(4) quantizing the equalized samples (351-354 in Fig. 3).

c) Regarding claim 14, Dabell discloses a method for adaptively equalizing a time staggered portions of a plurality of multi-gigabit analog information signals for respective signal paths, comprising the steps of:

(1) generating clock signals from the plurality multi-gigabit analog information signals (141-144 in Fig. 1, Col 3, L 6-9);

(2) sampling each of the multi-gigabit analog information signals at a plurality of phases of the respective clock signals (220 in Fig. 2, Col 3, L 24-27);

(3) measuring an equalization quality of the samples from one of the plurality of phases for each of the multi-gigabit analog information signals (as shown in Fig. 4);

(4) equalizing the samples from each of the phases of each of the multi-gigabit analog information signals based on the measured equalization quality of the one phase of each of the respective multi-gigabit analog information signals (330 in Fig. 3); and

(5) quantizing the equalized samples (351-354 in Fig. 3).

d) Regarding claim 15, Dabell discloses a method for adaptively equalizing a plurality multi-gigabit analog information signals for respective signal paths, comprising the steps of:

(1) generating a clock signal for each of the multi-gigabit analog information signals from each of the respective multi-gigabit analog information signals (141-144 in Fig. 1, Col 3, L 6-9);

(2) sampling each of the multi-gigabit analog information signals according to the respective clock signals (220 in Fig. 2, Col 3, L 24-27);

(3) performing an equalizing process on the samples (330 in Fig. 3); and

(4) quantizing the equalized samples (351-354 in Fig. 3).

e) Regarding claim 16, Dabell discloses a system for quantizing a multi-gigabit analog information signal, comprising:

(1) a sampler (220 in Fig. 2);

(2) an equalizer coupled to said sampler (150 as shown in Fig. 3); and

(3) a quantizer coupled to said equalizer (351-354 in Fig. 3);

wherein said equalizer minimize inter-symbol interferences in samples output from said sampler and said quantizer quantizes equalized samples output from said equalizer (Col 3, L 55-Col 4, L30).

f) Regarding claim 2, Dabell discloses the method according to claim 1, wherein step (2) comprises the steps of:

(a) comparing a multi-level representation of the equalized samples with the quantized equalized samples (640 in Fig. 6, Col 4, L 67 – Col 5, L9);

(b) performing a least-means-squared operation on results of the comparison (440 in Fig. 4, Col 4, L 8-11);

(c) adjusting an equalization coefficient with a result of the least-means-squared operation (Col 4, L 14-27); and

(d) repeating steps (2)(a) through (2)(c) (as shown in Fig. 4).

g) Regarding claim 11, Dabell discloses the method according to claim 1, wherein step (2) comprises the step of minimizing inter-symbol interferences in the samples (as shown in Fig. 4; Col 4, L 4-18).

h) Regarding claim 12, Dabell discloses the method according to claim 1, wherein step (2) comprises the step of minimizing inter-symbol interferences in the samples (as shown in Fig. 4; Col 4, L 4-18).

i) Regarding claim 17, Dabell discloses the system according to claim 16, wherein said equalizer comprises an finite impulse response filter ("FIR") (341-344 in Fig. 3) having at least one adjustable tap (as shown in Fig. 5), said system further comprising control logic coupled to said FIR (330 in Fig. 3), wherein said control logic generates tap updates for said FIR (440 in Fig. 4).

j) Regarding claim 18, Dabell discloses the system according to claim 17, wherein said control logic comprises:

a first input (141-144 in Fig. 3) coupled to an output of said equalizer (as shown in Fig. 3);

an analog-to-digital converter ("ADC") (321-324 in Fig. 3) coupled to said first input (141-144 in Fig. 3); and

a control module (330 in Fig. 3) coupled to an output of said ADC;

wherein said ADC generates multi-level representations of equalized samples (Col 3, L39-45), and said control module generates said tap updates from at least said multi-level representations of the equalized samples (440 in Fig. 4).

k) Regarding claim 19, Dabell discloses the system according to claim 17, wherein said control logic comprises:

a second input (301-301 in Fig. 3) coupled to an output of said quantizer (as shown in Fig. 3); and

a least-means-squared ("LMS") module coupled to said first and second control logic inputs (Fig. 4);

wherein said LMS module compares the multi-level representations of equalized samples with the quantized samples from said quantizer and generates said tap updates according to the comparison (Col 4, L 8-25).

8. Claim 21 is rejected under 35 U.S.C. 102(e) as being anticipated by Shimomura et al. (US 6,404,525 B1).

Regarding claim 21, Shimomura et al. disclose a system for routing and adaptively equalizing high data rate analog data signals, comprising:

a backplane (18 in Fig. 1) having a plurality of signal paths ($\lambda 1-n$ in Fig.1); and
at least one interface board coupled to said backplane, said interface board including a plurality of receivers coupled to said backplane signal paths, each said receiver including an adaptive equalizer;

wherein each said equalizer adapts to an associated backplane signal path to equalize an analog data signal received from said associated backplane signal path.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dabell (US 6,62,862 B1).

Regarding claim 3, Dabell discloses all the subject matters described above except for the specific teaching of equalizing process has a sub-sampling rate relative to the sampling rate of analog information signal.

However, it is well known and common knowledge that the equalizer sampling rate is not same as the input signal sampling rate due to tap coefficient in equalization control (as shown in Fig. 4). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention was made to conclude that the sampling rate of equalizer by Dabell is a sub-sampling rate relative to the input signal.

11. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dabell (US 6,62,862 B1) in view of applicant admitted prior art.

Regarding claim 4, Dabell discloses all the subject matters described above except for the specific teaching of equalizer process at an off-set of a sub-sampling rate relative to the sampling rate of analog information signal.

However, it is well known and common knowledge that ADC can operated on every equalized sample from the FIR filter, or any subset and or off-set thereof (Pg 6, [0144]). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention was made to conclude that the equalizer system by Dabell performs at an off-set of a sub-sampling rate relative to the input signal.

12. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimomura et al. (US 6,404,525 B1).

Regarding claim 21, Shimomura et al. disclose a system for routing and adaptively equalizing high data rate analog data signals, comprising:

a backplane (18 in Fig. 1) having a plurality of signal paths ($\lambda 1-n$ in Fig.1); and
at least one interface coupler (12 in Fig. 1) coupled to said backplane, said interface board including a plurality of receivers (13-n in Fig. 1) coupled to said backplane signal paths, each said receiver including an adaptive equalizer (14 in Fig. 1);

wherein each said equalizer adapts to an associated backplane signal path to equalize an signal received from said associated backplane signal path (as shown in Fig. 1).

Shimomura et al. disclose all the subject matter described above except for the specific teaching of an interface board coupled to the backplane. Instead, Shimomura et al. disclose optical coupler coupled to the backplane.

However, it is a common knowledge that an electrical signal router comprises interface board. In optical signal system coupler replaces an interface board. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention was made to realize that different signal system comprise different interface technology, although their functionalities are essentially the same. It would have been designer's choice merely base on signal source.

Allowable Subject Matter

13. Claims 5-10 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eva Yi EZheng whose telephone number is (571) 272-3049. The examiner can normally be reached on 7:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571) 272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-879-9306.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

Or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Eva Yi Zheng
Examiner
Art Unit 2634

September 23, 2004

A handwritten signature in cursive script, appearing to read "Shuwang Liu".

SHUWANG LIU
PRIMARY EXAMINER